

Discovery & Adventure

>>Discovery



>>Adventure



CYCLING PLUS

March Review C+117

Overall verdict - 9 out of 10

Frame - 9

Handling - 10

Gears & brakes - 9

Other components - 9

"The Thorn Adventure impressed immediately with wonderfull solid, steady handling at both low and high speed".



Derailleur Tandems



Riding Tandem is fun!

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For partners of unequal ability, riding tandem is the best way they can enjoy cycling together.

Once the energy wasted in concern and frustration by both partners has been harnessed into forward progress, the new tandem team, in all cases we have known, has gone on to exceed all their previous (realistic) cycling ambitions. For those with balance problems or visual impairments, stoking a tandem is the only way to obtain full cardiovascular fitness in the open air.

A tandem fitted with Kiddy Cranks (or even better a childback tandem) enables families to continue cycling during the early years of parenthood. It also introduces children to the pleasures of cycling in a safe, controlled environment which is stimulating enough to be anticipated with excitement.

When two cycling-fit and strong parties ride tandem the result is a shared athletic experience of a quality beyond words... and fast!



Why do all our tandems use 26" wheels?

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We use 26" wheels for many good reasons...

The 26" MTB wheel is known in every country in the world, so spare tyres are available everywhere.

26" wheels are much stronger than the same weight 700C wheels. When a tyre manufacturer makes a good 26" tyre they know that the potential sales are in the millions, if they know that they make a good (wide) 700C tyre the potential sales are only in the thousands. Therefore tyre manufacturers can afford to put much more capital into R&D and also use higher quality materials.



Isn't it hard work with big fat tyres?

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Not at all! The Panaracer Hi Road 26 x 1.5" tyres, that we fit as standard equipment, have a high quality casing. They weigh less, provide more grip, are more reliable, are more comfortable and have a lower rolling resistance than any 700 x 35C tyre available. We have sold literally thousands of them and we have never had a failure at the side wall, failure at the side wall is very frightening and potentially dangerous yet very common with many 700C tandems. See our 26" Touring Tyre Test.

The unique THORN 14 day pledge.

Talk to us, have us build you a THORN, and if you contact us within two weeks of delivery and tell us that you don't wish to keep it, for any reason, we will arrange to have it collected and refund you in full, provided that you have not damaged the machine. (If, owing to unforeseen circumstances, you are unable to ride the cycle during the first 14 days, contact us and we are likely to extend the period.)

Lifetime warranty available on frame and forks.
12 months warranty on components.

As you can see, we really can "guarantee your satisfaction".

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DAY MONEY
BACK IF NOT
DELIGHTED
GUARANTEE
ON ALL
THORN CYCLES

The THORN Tandem range...

THORN Voyager - We have achieved the near impossible and are able to offer a high quality Cro-mo tandem in 3 sizes, plus 2 childback designs, at an unbelievably low price. Many upgrades in specification are available.

THORN Explorer - With our new low cost entry level "serious" tandem... You could: Explore bridle ways and towpaths on Sunday mornings, explore country pubs on a summer's evening, or explore your own limitation on a long Audax ride. You could even explore Europe on a lightweight tour... **THORN Explorer**... A new kind of togetherness.

THORN Adventure - Designed for a lifetimes use, for every purpose from fast touring up to and including heavy camping over unmade roads. A serious machine handbuilt in the U.K. from our exclusive "Reynolds 531" tubeset which features a "conical" downtube.

THORN Discovery - The worlds ultimate expedition touring tandem!

THORN Trident - 3 adult triplet - (call now for latest price & specification)

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THORN

>> DISCOVERY & ADVENTURE

Discovery & Adventure Tandems

When we introduced our Thorn "Discovery" tandem in 1994 we knew we had produced the finest touring tandem in the world. We knew this because we had extensively tested our unique concept for several years (26" wheels and a stiff long wheelbase frame). We had also ridden all of the machines which may have been considered rivals. This is why we scored 100% in value for money in September 1995 Cycling Plus magazine. Although we now have some of our rivals building with 26" wheels none of them have come close to providing the geometry which makes our Discovery such a joy to ride and, what is more, some of our "would be competitors" are still building machines with 700C wheels even though the new mixed tandem End to End (Land's End to John O'Groats) record fell to the 26" wheel in May 2000.

So... nobody could argue that a 26" wheel was less strong than a 700C.

Nobody could argue that the selection and availability of 26" tyres was not superior to that of 700C.

As Andy Wilkinson and Lynne Taylor used them to slash 5 hours and 9 minutes off the End to End record who could argue that the 26" wheel was not faster?... Stronger, Faster, Better choice and availability...

Who could now seriously choose 700C for tandems?*

Our Discovery frameset with its beautifully fillet brazed marathon design and mega oversized tubes was much stiffer than any of the competition. The comfort came from:- giving the stoker plenty of room; using "proper" Reynolds 531 tandem fork blades (as opposed to rigid MTB Unicrown forks) and most importantly from the 26" tyres with their large air pocket. We added the most thought out and comprehensive set of brazed on fittings ever seen on a production tandem ... and we backed it all up with our exclusive 7 day money back guarantee ... NO WONDER WE HAD A WINNER!

Our refusal to fit fashionable, but inappropriate components for tandem use ("V" brakes with drop bar levers or drop bar S.T.I. for touring) without first explaining in depth why they were inappropriate further enhanced our reputation. The only real change in frame specification took place in 1997 when we moved to the superior 1 3/4" round heat treated 4130 base tubes.

But we NEVER stand still...

We intend to always be the market leader and now, before the competition even gets close to catching us up, we can unveil what we have been

developing in secret and testing on tour. Not one, but two tandems. He much improved (and considerably more expensive) double marathon 725 Discovery and the "as good as the 1994 Discovery" but much less expensive direct lateral 531 Adventure.

*PLEASE NOTE: We are not saying that there is something intrinsically magical about 26". It is the combination of the large air pocket (suspension) allied to light weight (easy to accelerate) with high quality of materials frequently used (manufacturers competing for a huge market) which makes them superior to 700C

Discovery

The new Double Marathon Discovery has been designed to be the "ultimate expedition tandem"... to make sure that this is a genuine claim and not an idle boast...

First we designed and commissioned our exclusive conical, mega-oversized, heat treated Reynolds 725 tandem tubeset. Then we designed and had manufactured our exclusive heavy-duty alloy eccentric and heat treated eccentric shell and also our own rear bottom bracket shell.

Next we designed our sealed capsule, stainless steel bottle boss. The shells' 5mm thick(!) walls have allowed us to be certain that there is no heat distortion in them, thus ensuring a close fitting, but easily adjustable eccentric.

The design of the shells has allowed us to build a totally sealed frame (except for the seat tube of course which must be open) the seat tubes drain condensation completely into the shells, (there being no "ledges" behind which moisture can collect) from where it can be drained via M8 x 0.75mm drain plugs! The sealed stainless steel capsule water bottle bosses make sure that a fresh charge of air cannot enter the sealed tubes.

To the best of our own knowledge nobody else goes to these lengths to ensure the maximum longevity of a frame.

Most high quality steel frames eventually die from internal rust, but by paying attention to easily visible external rust, regularly draining the frame and re-applying a rust inhibitor (via the drain plug) to the seat tubes and removing the seat posts for an annual re-grease... this frame will last a lifetime in any climate. If it spends most of its time far away from salt spray and acidic air, then it will outlast your grandchildren!

The shells are joined together with heat treated aerospace 4130 tubing 1 3/4" in diameter (very heavy customers could specify 2"). This assembly is the heart of our frame. The seat tubes are parallel wall 1 1/8" Reynolds 725 heat treated 1.0/0.7 gauge. The head tube is 1.5mm thick Reynolds 725, all the other frame tubes are our specially drawn "conical" 725 in 1.0/0.7/1.0 gauge. 1 1/2" to 1 3/8" downtube, 1 3/8" to 1 1/4" front tubes, 1 1/4" to 1 1/8" rear tubes.

The seat and marathon stays are both 19mm 0.9 gauge 725. The chainstays are a truly massive

32mm oval, the 12mm tips are 1.6mm thick! These socket in to the beefiest drop outs you have ever seen! Thus avoiding the other two major long term frame problems... if internal rust did not get them first, then frames have always eventually failed at the right rear dropout or chainstay tip... ours won't!

Forks

We have been busy experimenting and developing our forks. Curved Reynolds 531 forks are very comfortable, they need to be a very heavy gauge to be suitable for tandems. Reynolds "Jack Taylor", wide oval, fork blades give great comfort and are certainly strong enough for the job. However, tandems generate huge lateral forces within the blades. Especially when heavily laden in soft ground, sand or on deep gravel roads... we had noticed how, whilst being too uncomfortable to contemplate for long distance use, unicrown tandem fork blades did give better tracking and control in these extreme situations. Jack Taylor's blades may have been perfected, but we concluded the crown left a little to be desired.

Our new, fully tested, twin plate crown does attach the blades very securely to the steerer (Columbus, rifled, 1 1/8" Nivachrom) and the results are very noticeable... still supremely comfortable but now with truly superb tracking and control. We actually think they look elegant, in a functional, retro sort of way.

So... new frame materials, new shells, new drop outs, new forks & longer life... all very well... but what is it like to own and ride? Our original Discovery's comprehensive "braze ons" impressed everybody, other than re designing the dynamo and drag brake bosses we have left well alone here. Our original Discovery always amazed people with its rigidity and handling... we got the geometry right first time (well, actually we did do many years of R&D to get there). We cannot improve on it ... so we certainly have not changed it!

Contrary to what anybody else may think we believe a tandem cannot be too rigid... especially when huge loads are carried... so we have settled on a "double marathon" design. Stoker comfort comes from the fat tyres and a suspension seat post, it should not have to compromise loaded handling! The need to turn the pedals without hitting one's feet dictates what is in effect a "two dimensional" structure, it would be impossible to make it too stiff! **Trust us and try it ... remember we back up our claims with a money back if not satisfied guarantee!**

Our machine will out last you both and give you the ride of your lives, whilst carrying whatever you can manage to pile aboard it! (our 531 heavy-duty low loaders and 531 rear carriers will help here!)

Two people staying at hotels, carrying weather-proof clothes, a few spares and a bit of food need a surprising amount of luggage capacity... Two people comfortably camping, cooking and riding alternately in high, cold mountains and hot dry plains need a huge volume and weight of equipment. Add to that several days' provisions and in some cases, water supplies and include an interest in photography and the quantity involved becomes prodigious.

The typical ultra light weight direct lateral "touring" tandem (even supposing it survives baggage handlers) will feel like two uncontrollable weights joined together by a rubber frame. It will not corner properly, you cannot "push" hard when required and don't even think about getting off the saddle! Of course our Discovery weighs more but not only is it much more likely to arrive undamaged, it will take **much less effort to ride when loaded.**

The way in which the Discovery carves through the hairpins, the stable platform it gives for either party to get out of the saddle at will and "honk" and it's "bomb proof" build will ensure that the Discovery is still a valid choice for tandemists who have no intention of ever carrying heavy loads!

When we designed our new Discovery we did not pause to consider how much each improvement would cost... we wanted to make the **ULTIMATE MACHINE** and we felt some people would pay whatever it cost ... as it is we have undercut many manufacturers of vastly inferior products!

But we realised that in making the "ultimate expedition tandem" we would price many tandem couples out of the market ... so we designed the Thorn Adventure.

Adventure

This shares the Discovery's eccentric, shells, base tube and rear drop outs. The tubes are sealed **except** that we do not use the sealed stainless bottle bosses (so you should avoid removing the screws as much as possible). We have used a much easier to manufacture direct lateral design and designed our 531 tandem tube set... conical downtube (1 1/2" to 1 3/8" 0.9/0.6/0.9). The other tubes are all mega oversized parallel wall 0.9/0.6/0.9 except the seat tubes which are 1.0/0.7/1.0. We use 19mm seat stays and Reynolds tandem chainstays.

We also have included a twin plate crown, but we have used "ordinary" continental oval **Reynolds 531 tandem** fork blades.

The result is a very stiff, (compared to other tandems but obviously not compared to the Discovery) fairly lightweight, superb handling and a much more **affordable** tandem.

The method of construction we employ is the same with the Adventure and the Discovery. A method only the world's finest crafts persons can master, a method which keeps heat-damage to the tubes to a minimum and simultaneously best spreads the forces from the joint smoothly through the tubes. The **ultimate method** of joining two high quality tubes... **100% low temperature fillet brazing!** With the Adventure, however we have decided to invest less time (money) in painstakingly filing the fillets. They are still very neat and tidy, but not the "works of art" that distinguish the Discovery.

Brazed-on Fittings

> The Adventure and Discovery are each built in 4 different size combinations.

> They have very strong, solid, socketed vertical dropouts and provision for a four-point rear carrier.

> Braze-on front lowriders, these are wider than the fork blades and subsequently do not require spacers to fit them. They can be fitted or removed in a couple of minutes. (We will not drill a hole through the blades.)

> Mudguard eyes on rear ends and on the curve of the fork blades. If a stick or a coke can etc is picked up by the front tyre and jams between the tyre and guard then, with the eyes in this position, the gap between the tyre and guard gets greater not smaller and the object is more likely to drop away than to lock the wheel.

> Bosses under the fork crown, seat stay bridge, chainstay bridge and marathon bridge to bolt the mudguards to (very neat).

> The Adventure has 3 sets of bottle bosses - 5 on the Discovery.

> Obviously it has cantilever bosses.

> Down tube bosses for cable adjusters (or gear levers).

> Brazed-on metal (not pop rivetted plastic) slides under the bottom bracket for gear and drag brake cables.

> Drag brake fittings:- slotted stop under down tube, guides under bottom brackets and bosses to fit a slotted plate for torque arm under chainstay... neat and effective, yet very discrete if not used.

> Slotted stops and guides for rear gear run, slotted stop for rear gear outer.

> Heavy duty cable hanger with adjuster for rear brake cable and reinforced pump peg on bottom tube to take size 4 pump.

> Provision for bottle dynamo boss on left hand fork blade (a bottle dynamo and lightweight headlamp weigh less than 2 'D' cells, are not prone to theft, cannot be forgotten or run flat and give a light good enough to see by. It is easily switched on or off when on the move and is especially useful when descending).

> Twin seat post clamp bolts on front seat tube (The captain's seat post also provides an anchorage for the stoker's stem. We have often had problems getting a single clamp bolt tight enough. The potential accident from this overstressed item failing is too frightening to contemplate... no worries with our setup).

> Curved seat stay bridge - minimises flexing in seat stays during braking thus reducing brake squeal.

> 6mm boss behind fork crown to fit our bellcrank assembly, 5mm boss on fork crown, (front light?).

> Tandems eat headsets! So we have fitted the best available headset... The aerospace bearing F.S.A Orbit II

> M8 x 0.75mm drain plugs are incorporated into specially produced front and rear shells.

Which should you choose on a tandem?

We would always favour drop bars on a solo... but the choice is not so clear cut on a tandem. We are not so keen on "dead straight" bars, because they internally rotate the wrist causing discomfort which can be transferred to the elbows, shoulders and upper spine.

Mountain bike bar ends correct this but leave you remote from the brakes and gears and in any case they are not as comfortable as lever hoods. However, our 180 degree bend "straight" comfort bars are designed with the input from a senior physiotherapist to allow external rotation of the wrists, which is a more natural position. Our "comfort bars" also have a 50mm rise which, as well as providing extra height allow the forward reach to be adjusted by rotating the bars. A brief trip back into cycling history reveals that there really is nothing new about these bars. For decades they were known as "touring bars" and also as "all rounder bars"... ours however use the latest advances in aluminium alloy... butted 6061 T6 and they are manufactured to be the correct diameter (22.2mm) for mountain bike brake and gear levers... we **like** these bars.

Part of the appeal of tandem riding is the ability to communicate with each other, if the captain is "down on the drops" not only do your words get "lost in the wind" but any aerodynamic advantage gained by doing so is lost because the stoker is now "up in the breeze". The stoker could of course also adopt an aerodynamic position, in which case you certainly would be able to really fly along... but does **your** stoker want to do that? A tandem can be blindingly fast but it is not the only reason for having one!

If you have our comfort bars you can also make use of 'V' brakes which are slightly more powerful and certainly easier to set up than our Suntour self energising cantilevers, which **you must use** if you want drop bars.

You can also use all that MTB technology and use Shimano's ergonomic S.T.I. gear shift system. This works so well and is so reliable that we have used it and can recommend it on heavy camping tours. With this system you can brake and change gear at the same time, which is useful when coming down a steep hill and finding a tight bend at the bottom with a steep climb immediately afterwards!

Straight bars allow more leverage over the steering... useful in traffic, off-road (especially in soft conditions) and when your stoker starts to move around unexpectedly and upsets the steering (less of an issue on our new Discovery).

So are you seeking speed and aerodynamic efficiency above all else or are you looking for a shared adventure where you can communicate with each other during it?

Actually you can have both!

Andy Wilkinson and Lynne Taylor not only used 26" wheels to break the End to End record... they also used straight bars! They did, however use triathlon bars mounted to them for the fast bits and the straight bars were presumably used for the tricky bits!

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We can (and have!) set up your machine in a similar way... it wouldn't have to be as radical as Andy and Lynne's bike.

If you are set on drop bars, fair enough, we have got the best brakes to work with drop bar levers... Suntour self energising and we would **very strongly recommend** that you use bar end shifters... these work well, much better than drop bar S.T.I. (especially the front change) and unlike drop bar S.T.I. they carry on working year in year out. **DON'T HAVE DROP BAR S.T.I. ON A TANDEM!** (unless you can cope with 2 chainrings which will work fine).

When chosen with drop bar option we can't use 'V' brakes so we fit the most powerful cantilever brakes that have ever been made... Suntour XC Pro SE (self-energising). Self-energising brakes pivot on a 45° thread, and are held away from the rim by a massive compression spring. When operated, the rotation of the rim pulls the blocks forward and consequently inwards, thus utilising the kinetic energy of the wheel to assist braking effort.

The net result is a very powerful brake which requires little effort at the brake lever, indeed even from the hoods it is possible to execute a rapid emergency stop.

Suntour SE brakes are beautifully cast and machined and unlike others it is possible to get inside them for cleaning and regreasing. Unfortunately Suntour only ever made the rear SE, so we have devised a bellcrank to enable the brake to be operated when fitted behind the front forks.



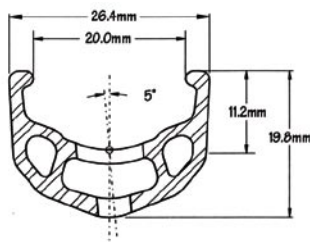
Suntour SE brake & Thron Bell crank.

Which Wheel & Tyres?

We offer both the Adventure and the Discovery with 48 hole Shimano XT tandem hubs (threaded for a drag brake) these truly excellent hubs accept 8 or 9 speed cassettes. Laced with DT stainless steel spokes into a choice of either Sun Rhino or Sun CR18 rims... which should you choose?

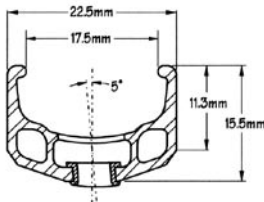
The Rhino's are heavy (758g), mega strong and very, very reliable. They take a long time (a lifetime?) to wear through.

They do however take more effort to accelerate than the considerably lighter (460g) Sun CR18. We have specified Sun CR18 rims because they have a reasonable wall thickness at the braking surface and in fact build into a very good, strong pair of wheels. Please note that a bike with a nice, light pair of wheels takes less effort to ride and is a joy to ride ... but a bike with a broken wheel can't be ridden!



You should choose Sun Rhino if:

1. You plan to regularly go on long, heavily laden touring holidays or are planning the "adventure of a lifetime".
2. You live in a very hilly area and you use your brakes constantly.
3. Your combined weight is over 170kg ... even if you don't carry much.
4. You don't concern yourselves with performance but value the peace of mind and lack of hassle that comes with the "bomb proof" build.



You should choose Sun CR18 rims only if you want as sporty a machine as possible and your all up weight is less than 190kg. If you live in a hilly area you must either not brake much or you must be prepared to replace the rims regularly.

Tyres are your only contact with the road. Your lives depend upon them!

The right tyre choice is important... however there is only a "right choice" for your particular requirements, for example... a pair of ultra light, sticky rubber, Panaracer Hi Road 1.75" folding tyres may not even last 2000 miles on a tandem ridden on a highly abrasive road surface... but they are unlikely to dump you in a heap at the side of a greasy road. Whilst they may well be a valid choice for touring they certainly would be an unusual choice for a 10,000 mile round trip, which we feel sure one pair of Schwalbe Marathon XR tyres could manage without a problem!

We have a real depth of knowledge and experience with all tyres listed as options. We have been quite candid with our comments and we feel this is as accurate a "giant tyre test" as we have ever seen.

Read carefully and make your own choice... We can always be contacted for advice. (see 26" touring tyre test)

Do we need a drag brake on our tandem?

A drag brake is a third brake which acts at the hub rather than the rim. It is applied to control the speed of descent without causing the rims to heat up. If the rim brakes are applied for long periods of time (even gently) then the rims will get very hot, this used to cause tyres to blow off due to increased pressure. Nowadays this will not happen with our recommended 26 x 1.5" tyres, but at even higher temperatures the seam in the inner tubes will split causing instant tyre deflation when enough heat has been generated.

It is important to understand that braking very hard from high speeds does not cause much heat build up... it is the application of rim brakes for a long period of time to hold the speed down that causes problems.



Whether you need a drag brake or not is a contentious issue among tandem riders. Even here at sjscyclews.com we have differing opinions.

Here is what we agree on:

1. A drag brake will not help you stop any quicker in an emergency.
2. A drag brake weighs 1kg and even with our Quick release kit rear wheel removal is more time consuming.
3. When rims are new they have a rough surface which creates more friction and thus more heat... take extra care when new.
4. A drag brake will keep your speed down without heating your rims up.
5. A ratchet operated drag brake will help keep your hands free of cramp and makes a great parking brake!
6. A drag brake is only of any use in hilly areas, apart from being a great parking brake.
7. The greater your all up weight the more likely you are to need a drag brake.
8. The more slowly you descend the more your rims will heat up, if you have no drag brake.
9. There are very few hills in the UK which are steep enough for long enough to need a drag brake, unless you deliberately look for them or you are particularly nervous about descending.
10. There are many hills in other countries which are long and steep and have hairpin bends.
11. If you find you have been using your rim brakes for a long period of time you can always stop and let your rims cool off.

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12. If you are experienced tandem riders you may well have developed a strategy that will enable you to cover any terrain without using a drag brake (eg going very fast, braking late, alternating front and rear braking... and if you get caught out by circumstances... stopping for a while.

13. If you have strong feelings about having a drag brake, trust your feelings and don't let anybody put you off having one.

14. What we all agree on here at sjscycles is that if you have a drag brake it should be operated by the pilot, via a ratchet lever. We don't believe it is a sound idea to have somebody who isn't steering the bike to have control over it's braking - you don't do it with a car.

Thorn Direct Drive

Our standard specification uses our Thorn Direct Drive... the connecting chain and connecting chainrings are mounted on the same side as the transmission, giving straight through drive.

The advantages are:

1. There is much less strain imposed upon the rear bottom bracket using direct drive.
2. All the chains are on the right hand side and so the cycle may be picked up by the crew from the left hand side without getting messy.

There are no disadvantages once you have a frame designed and built for Direct Drive.



Sizing

Whilst our new tubesets have been produced to allow us to increase the room for the stokers on the largest sizes, we have actually decreased the room available for stokers on the smallest sizes (we noticed they were almost all being specified with long stokers stems). The middle size has stayed the same... a little (we are not saying what) over 27". As a result of all the data we have collected over 7 years we have been able to reduce the number of frame sizes available, we now offer 4 sizes... one of which will prove ideal for 90% of our customers. For the remaining 10% we will build a custom frame (Discovery or Adventure) for a small extra cost (if it is required).

Paint Finish

The Adventure is available in metallic British Racing Green... any other colour can be specified at extra cost.

The Discovery is available in metallic Cobalt Blue ... any other colour can be specified free of charge* but will involve a 4 to 6 week delay.

*Our "Billiard Cue" finish looks stunning, particularly on a tandem... this is available but at extra cost.

Yes it's obvious that you have certainly thought a great deal about the Discovery and Adventure how can I arrange a test ride to be sure you have got it right?

You can't! Each tandem is built up individually for each customer. If it is ridden for even a short while it is a secondhand machine. In any case it would take more than a quick spin around the block to test-ride any bike.

We are, however, so confident that we have produced the best touring tandem available for the money that we will make you this pledge: "Talk to us, have us build you a Discovery or Adventure and if you contact us within 2 weeks of delivery and tell us that you don't wish to keep it, for any reason, we will arrange to have it collected and refund you in full, providing that you have not damaged the machine". (If due to unforeseen circumstances you are unable to ride the tandem during the first week, contact us and we are likely to extend the period).

For the original purchaser we offer a lifetime warranty on frame and forks... 12 months warranty on components.

As you can see we really can "Guarantee Your Satisfaction"

Tandem Sizing

Sizing tandems can be difficult and confusing... where do you measure them to and from?

Here are the possibilities:

1. When we design a frame we measure them from the centre of the bottom bracket (crank axle) to the centre of the intersection between the top tube(s) and the seat tube(s). Many mountain bikes are also measured this way... this method makes a frame sound much smaller than it is if it has a sloping top tube (which our tandem frames all have).
2. You can measure from the centre of the bottom bracket to the top of the seat tube. This can tell you if you have enough seatpost out of the frame to allow: **a.** room to fit a stokers stem to the front seatpost, **b.** room to fit a suspension seatpost to the rear seatpost.
3. If you want dimensions... we prefer to use the "equivalent UK solo size", as it more accurately conveys the actual size of the tandem. (figure 1.)

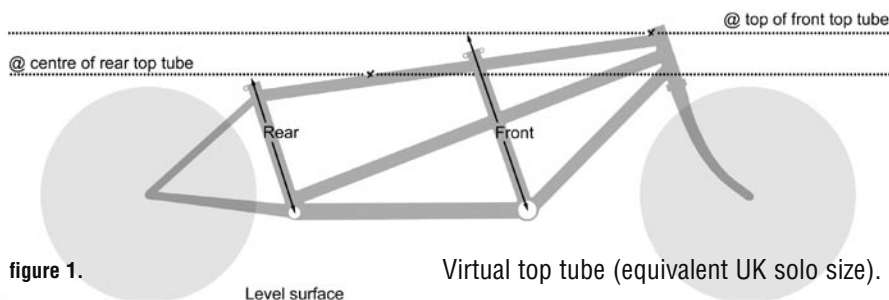


figure 1.

Front: On the front of a tandem you may have to stand as far forward as the handlebar stem, so we give an "Equivalent UK solo size" as if the top tube was parallel to the ground at this point.

Rear: On the rear of a tandem we give the "Equivalent UK solo size" as if the top tube was parallel to the ground at the centre of the tube (you don't need to stand any further forward on a tandem than this).

4. For simplicity we have called our frames - S/S, M/M, L/L and L/S (small, medium, large and large/small). Our childback sizes we call XXS.

Most (99%) adult tandems are sold to crews who comprise of a male pilot and female stoker. We have designed our tandems for a male/female combination.

Virtual top tube (equivalent UK solo size).

If you are a male/male, female/female or female/male combination you need to consult with our frame designer.

We also give the sizes of typical UK sized touring solos that our tandems are equivalent to (regarding handle bar height, standover and reach) e.g. Size M/M is suitable for a medium height male pilot who would be happy to ride a 22" touring solo and a medium height female stoker who would be happy to ride a 19" touring solo. (see figure 2.)

5. To double check your assessment of sizes XXS, S, M and L you can measure your Standover Height. Do not use your trouser size... this is usually 2" to 2.5" (50 to 63cm) less than your standover height and may result in the wrong size frame being built!



Tandem frame dimensions

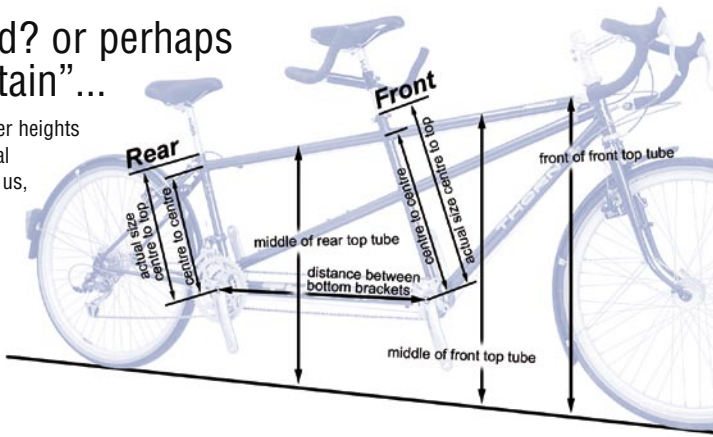
figure 2.

THORN Size (see point 4.)	Seat tube centre to centre (front/rear) (see point 1.)	Actual size centre to top of seat tube (front/rear) (see point 2.)	Virtual seat tube equivalent UK solo size (front/rear) (see point 3.)	Standover heights (see point 5.)			Distance between bottom brackets
				@ front of front top tube	@ middle of front top tube	@ middle of rear top tube	
S/S	17.25"/15.75"	500/435mm	20"/17.5"	775mm	750mm	705mm	25.5"
M/M	19.5"/17.5"	550/482mm	22"/19"	800mm	780mm	745mm	27"
L/L	21.5"/19.25"	600/522mm	24"/21"	850mm	830mm	785mm	28"
L/S	18.75"/14.25"	525/403mm	23.5"/18"	835mm	780mm	705mm	25.5"
S/S	18"/16"	510/425mm	21"/18.5"	755mm	730mm	690mm	27"
M/M	20"/18"	560/480mm	23"/21"	800mm	775mm	740mm	27"
L/S	19"/14"	525/380mm	24.5"/17"	840mm	785mm	670mm	27"
L/L	22"/20"	602/530mm	24"/21"	850mm	830mm	785mm	27"
M/XXS	17"/11"	480/295mm	24"/15.5"	770mm	710mm	590mm	24"
S/XXS	15.75"/11"	450/295mm	21.5"/15"	710mm	665mm	575mm	24"

Still confused? or perhaps just "not certain"...

Then, have your standover heights (in shoes) and your actual heights ready and phone us, if you can tell us what you would like to do on the tandem we can do the rest.

We have thousands of happy customers, talk to one! ... better still talk to us!



To measure your standover height...

1. Stand in cycling shoes with your back against a wall, feet together.
2. Place a large coffee table style book against the wall (between your legs).
3. Raise the book as high as it will comfortably go.
4. Measure from the floor to the top of book, that is your standover height.

S & S couplings



Problems transporting your machine?

**S & S Machines
Bicycle Torque
Couplings (BTCs)**

S & S Machines - Bicycle Torque Couplings (BTCs)

These allow the cycle frame to be easily broken down into two sections.

Steve Smilanick is S & S Machine's President ... and he is a cyclist. He wanted an easily transportable but "proper" bike... so he designed and made himself the first pair of BTCs... he was very pleased with the result... so he made some more!

Roseville (California)-based S & S Machine's core products are numerous mechanical parts, the exit cone and the aft closure for the last remaining Star Wars project, the theatre high altitude area defence system (THAADs) missile. Historians will surely argue that Reagan's Star Wars projects brought about the end of the cold war. It is fitting that a company with these skills and background is now producing a product that can transform humankind's greatest invention ... THE BICYCLE!

BTCs are made from 17- 4 (chromium-nickel) stainless steel, described by its manufacturers as being suitable for use in a variety of critical applications such as "jet engine parts" and "nuclear reactor components". Certified test reports show that the lugs have an average yield strength of 141,500 p.s.i.

The machining is carried out on a Mazak Multiplex C.N.C. machine (dual C.N.C. lathes with full milling capability at each position).

The machine, which costs \$400,000, allows each lug to be made without changing fixtures and therefore with an accuracy and repeatability of 0.0001 inch!

The couplings have (precisely machined) trapezoidal teeth that are brought together by a stainless steel ring (surface hardened to a higher degree than the thread on the lugs to reduce galling). The clever design is self-aligning and self-adjusting and has absolutely no movement.

S & S Machine's have obviously subjected the couplings to strenuous tests. The full details of these tests may be viewed on their website (www.sandsmachine.com).

Briefly they have demonstrated that a tube fitted with a BTC is :

A) Stronger in torsion, B) Stronger in tension, C) Resists bending more

than a tube without a BTC fitted.

We can offer any of the following models fitted with S & S couplings: XTC, eXp, Nomad, Discovery, Adventure, XTC Classic SWB, Audax Classic, Audax 853 & Cyclosporitif... for other models please call.

All of the 26" wheel cycles can be specified so that they fit inside a 26" x 26" x 10" (661 x 661 x 254mm) case (700C wheel cycles would ideally use a slightly larger case).

An S & S-coupled cycle will not only fit inside most cars and taxis but may also be transported (free of charge) on trains and coaches. There is obviously less chance of such a machine being damaged during air travel.

The lugs have a jewel-like quality which actually enhances the appearance of the frame. As you can see, these couplings are of extremely high quality and high tech and, because they are made in the land of litigation, BTCs when built into a frame are perfectly aligned, strong, lightweight, durable, reliable, undetectable in use and very expensive!

DISCOVERY & ADVENTURE ORDER FORM

Customer Name _____	Invoice N° _____
Address _____	
Postcode _____	
Telephone Number Home _____ Work _____ Mobile _____	
Email _____	

Adventure + Discovery Tandems	Adventure	Discovery
Frame and fork only - including F.S.A. Orbit II aerospace bearing threadless headset, including alloy eccentric, in British racing green metallic and all stainless steel screws. Size : LL ☐ LS ☐ MM ☐ SS ☐	£899	£1499
Complete Tandem in standard spec Size : LL ☐ LS ☐ MM ☐ SS ☐	British Racing Green metallic £1599	Cobalt Blue £2499
1. Custom size frame in any single colour you like - 8 to 12 weeks wait (must be paid for in full at time of order) Details : _____ Colour : _____	£200	£100
2. S+S couplings 2 piece tandem frame in any single colour you like ... front off ☐ Colour : _____	£550	£500
3. S+S couplings 2 piece tandem frame in any single colour you like ... 2 equal length sections ☐ Colour : _____	£550	£650
4. S+S couplings 3 piece tandem frame in any single colour you like Colour : _____	£1050	£1150
5. Custom Colour ... any single colour you like - 6 to 12 weeks wait (must be paid for in full at time of order) Colour : _____	£50	£0
6. S+S couplings in a hurry! - 3 to 4 weeks wait We will blast the paint off a stock frame (if available) 2 piece tandem frame in any single colour you like ... front off ☐ Colour : _____	£650	£600
7. S+S couplings in a hurry! - 3 to 4 weeks wait We will blast the paint off a stock frame (if available) 2 piece tandem frame in any single colour you like ... 2 equal length sections ☐ Colour : _____	£650	£750
8. S+S couplings in a hurry! - 3 to 4 weeks wait We will blast the paint off a stock frame (if available) 3 piece tandem frame in any single colour you like Colour : _____	£1150	£1250
9. Custom Colour in a hurry! - 2 to 3 weeks wait We will blast the paint off a stock frame (if available) in any single colour you like (must be paid for in full at time of order) ... Colour : _____	£150	£100
Paint Upgrade add to options - 1, 2, 3, 4, 5, 6, 7, 8 or 9 (must be paid for in full at time of order) ... "Billiard Cue" paint finish - 1 extra weeks wait Main colour (rear) : _____ Second colour (front) : _____	£100	£100
Paint Upgrade add to options - 1, 2, 3, 4, 5, 6, 7, 8 or 9 (must be paid for in full at time of order) ... Any other finish - extra time varies with finish	P.O.A.	P.O.A.

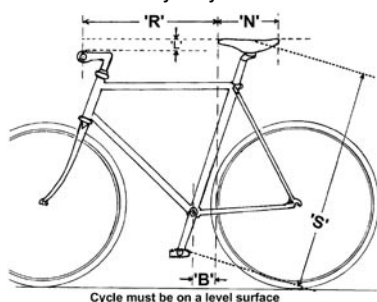
Sub Total £

Please Note:- Occasionally some items become unavailable for long periods of time. We reserve the right to substitute items of similar (or greater) value where there will be no adverse difference in function. No surcharge will be made.

TANDEM SETUP DIMENSIONS... Please fill in

Front Rider	Rear Rider
1. Your sex* = Male ☐ Female ☐	1. Your sex* = Male ☐ Female ☐
2. Your height = _____ cm	2. Your height = _____ cm
3. Your stand over height (inside leg measurement from crotch to floor in shoes, not trouser size) = _____ cm	3. Your stand over height (inside leg measurement from crotch to floor in shoes, not trouser size) = _____ cm
4. Body type* = Long legs ☐ Short legs ☐ Average ☐	4. Body type* = Long legs ☐ Short legs ☐ Average ☐
5. Preferred riding style* = Upright ☐ Relaxed ☐ Sporty ☐ Aggressive ☐ Racing ☐	5. Preferred riding style* = Upright ☐ Relaxed ☐ Sporty ☐ Aggressive ☐ Racing ☐

The following dimensions will enable us to set up your tandem exactly like your favourite machine.



	Front	Rear	
N =	_____ / _____	_____ / _____	mm - Name of Saddle or if not a current type, overall length.
S =	_____ / _____	_____ / _____	mm - Distance from top of pedal (with crank in line with seat tube) to top of saddle, measured along the seat tube.
B =	_____ / _____	_____ / _____	mm - Distance that a plumb line (weight on a bit of thread) falls behind the centre of the bottom bracket when suspended from the tip of the saddle.
L =	_____ / _____	_____ / _____	mm - Distance from the bottom of a level straight edge placed on the top of the saddle to the top of the handlebar stem.
R =	_____ / _____	_____ / _____	mm - Distance from tip of saddle to the centre of the handlebars.

Note: The dimensions you send us must be accurate, otherwise this is a meaningless exercise Get somebody else to check your measurements.

Standard Components	Adventure	Discovery
1 1/8" threadless F.S.A. Orbit II aerospace bearing headset ... currently the best available), High quality brake + gear inner wires and outer cables, alloy eccentric, stainless steel fittings, 1 1/8" alloy "front loading" threadless stem (length / angle + alloy spacers to suit), no pedals supplied.	Standard	Standard

TRANSMISSION OPTIONS + UPGRADES

Transmission Options	Adventure	Discovery
Standard Adventure Transmission - Shimano LX M571 front and LX M570 (SGS) rear mech Shimano HG70 (silver) 9 speed cassette 11-32 (11/12/14/16/18/21/24/28/32) Shimano UN52 sealed bearing bottom brackets Sachs 9 speed (silver) final drive chain + Sachs black connecting chain Thorn Direct Drive using - Shimano 9 speed Deore M510 Hollowtech chainsets (4-Arm) 22 / 32 / 44T (26T connecting rings) Choice of crank length* Front 170mm ☐ 175mm ☐ Rear 170mm ☐ 175mm ☐	Standard	P.O.A.
As above but with* 22 / 36 / 48 ☐ or 26 / 36 / 48 ☐ rings	£15	P.O.A.
Standard Discovery Transmission - Shimano XT M751 front and XT M750 (SGS) rear mechs Shimano XT M750 (silver) 9 speed cassette* 11-32 (11/12/14/16/18/21/24/28/32) ☐ 11-34 (11/13/15/17/20/23/26/30/34) ☐ 12-34 (12/14/16/18/20/23/26/30/34) ☐ Shimano ES70 splined sealed bearing bottom brackets Sachs 9 speed (silver) final drive chain + Sachs black connecting chain Thorn Direct Drive using - Shimano 9 speed XT M751 Hollowtech chainsets (4-Arm) 22 / 32 / 44T (26T connecting rings) Choice of crank length* Front 165mm ☐ 170mm ☐ 175mm ☐ 180mm ☐ Rear 165mm ☐ 170mm ☐ 175mm ☐ 180mm ☐	£190	Standard
As above but with* 22 / 36 / 48 ☐ or 26 / 36 / 48 ☐ rings	£20	£20
For a greater range of crank lengths and ring sizes we can offer X-Over Drive using - Thorn alloy 110 / 74 PCD tandem chainsets Choice of ring sizes* 24 / 36 / 46T ☐ 24 / 38 / 48T ☐ 24 / 40 / 50T ☐ 26 / 42 / 52T ☐ Choice of crank length* Front 150mm ☐ 155mm ☐ 160mm ☐ 165mm ☐ 170mm ☐ 175mm ☐ Rear 140mm ☐ 145mm ☐ 150mm ☐ 155mm ☐ 160mm ☐ 165mm ☐ 170mm ☐ 175mm ☐ Note - Not S.T.I. compatible (for straight bars you must use Sachs Attack 9 speed twist grip shifters)	£0	P.O.A.

Please Note:- Occasionally some items become unavailable for long periods of time. We reserve the right to substitute items of similar (or greater) value where there will be no adverse difference in function. No surcharge will be made.

* = Please ☒ tick box required

Sub Total £

BAR OPTIONS + UPGRADES

Captains Straight Bar Options	Adventure	Discovery
Thorn Comfort bars Mk2 - Our own design (in consultation with a senior physiotherapist) butted (3.0/1.8) 6061 T6 alloy 18° + black grips	Standard	Standard
As Above but with bar ends fitted in between the brake levers and handlebar grips (Highly recommended) On Adventure brake levers are upgraded to XT M739 1999 'V' brake levers to allow correct fitment	£50	£20
"Straight (5°) cross country style bars with stubby bar ends + black grips	£10	£10
Shimano LX M570 S.T.I shifters pods , LX M570 'V' brake levers, LX M570 'V' brakes (NOTE - Only if Shimano chainsets chosen)	Standard	P.O.A.
Shimano XT M750 S.T.I shifters pods , XT M739S 'V' brake levers, XTR M951 'V' brakes (NOTE - Only if Shimano chainsets chosen)	£80	Standard
Sachs Attack 9 speed twist grip shifters , LX M570 'V' brake levers, LX M570 'V' brakes (NOTE - Works with all chainset options)	£0	P.O.A.
Sachs Attack 9 speed twist grip shifters , XT M739S 'V' brake levers, XTR M951 'V' brakes (NOTE - Works with all chainset options)	£80	£0

Captains Drop Bar Options	Adventure	Discovery
Drop bar option (A) Anatomic alloy drop bars* 42cm ☐ 44cm ☐ (centre to centre) with Shimano Dura-Ace bar end shifters + down tube cable stops, Suntour SE (self-energising) front and rear brakes + Shimano XT complete cartridge brake shoe set - set of 4 (Superb characteristics, durability and performance) - (These are the best rim brakes you could possibly have (no matter how much money you spend) with drop bars) + Thorn bell crank assembly and in-line cable adjuster for front brake, Shimano R400 aero brake levers + black cork tape	£80	P.O.A.
Drop bar option (B) As above, but with Shimano R600 Super SLR aero brake levers (Longer lasting)	£103	£0
Upgarde to Modolo Q Race 6082 T6 anatomic alloy drop bars 45cm (centre to centre), black	£20	£20

Stokers Bar Options	Adventure	Discovery
Thorn stokers bars + black cork tape	Standard	Standard
Thorn Comfort bars Mk2 Our own design (in consultation with a senior physiotherapist) butted (3.0/1.8) 6061 T6 alloy 18 O + black grips	£0	£0
"Straight" (5°) cross country style bars with stubby bar ends + black grips	£10	£10
Stokers stem* Fixed length stokers stem A 115mm ☐ Fixed length stokers stem B 130mm ☐ Other Please specify: ☐ If you don't know what stem you want let us decide from your dimensions ☐	Standard	Standard

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* = Please ✓ tick box required

Sub Total £

STANDARD COMPONENT SPECIFICATION OPTIONS + UPGRADES

Wheel, Tyre, Mudguard & Drag Brake Options	Adventure	Discovery
Handbuilt wheels - 48 hole Shimano XT Tandem hubs (threaded for drag brake) 145mm OLN built with DT stainless steel spokes, Velox rim tapes and High quality presta valve butyl inner tubes. Choice of Sun Rhyno ☐ or Sun CR18 ☐ rims	Standard	Standard
Panaracer rigid (wire bead) tyres* Hi Road 26 x 1.5" ☐ with SKS P45 (standard) mudguards* Silver ☐ Black ☐	Standard	Standard
Panaracer folding tyres* Hi Road 26 x 1.5" ☐ or Hi Road 26 x 1.75" ☐ with SKS P45 (standard) mudguards* Silver ☐ Black ☐	£20	£20
Panaracer rigid (wire bead) tyres* Pasela Tourguard 26 x 1.75" ☐ with SKS P45 (standard) mudguards* Silver ☐ Black ☐	Standard	Standard
Drag brake complete with lever + cables and fitted with our QR kit	£110	£110

Saddle & Seatpost Options	Adventure	Discovery
Alloy micro adjust seatpost	Standard	Standard
Gents Gel saddle, fitted to the Front	Standard	P.O.A.
Ladies Gel saddle, fitted to the Rear	Standard	P.O.A.
Terry Gents Liberator Y Ti saddle, fitted to the Front	Front £25	Front £25
Terry Ladies Liberator X saddle, fitted to the Rear	Rear £20	Rear £20
San Marco Rolls Classic, fitted to the Front	Standard	Standard
San Marco Rolls Classic, fitted to the Rear	Standard	Standard
Brooks B17 Standard, in black, fitted to the Front	Front £17	Front £7
Brooks B17 Standard, in black, fitted to the Rear	Rear £17	Rear £7
Other Saddle Front Please specify: _____	£ _____	£ _____
Other Saddle Rear Please specify: _____	£ _____	£ _____
USE XCR Alien (with layback) suspension seatpost - 64mm travel, 400mm length, including shim, silver - heavier, but really helps take out the big bumps (fitted to the rear only)	£90	£90

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* = Please ☒ tick box required

Sub Total £

STANDARD COMPONENT SPECIFICATION OPTIONS + UPGRADES

Warranty	Adventure	Discovery
Frame & fork warranty - Lifetime	Standard	Standard

Pedals	Front	Rear
Shimano PD-M959 SPD double sided pedals (including cleats)	£75	£75
Shimano PD-M540 SPD double sided pedals (including cleats)	£35	£35
MKS GR9 platform pedals, including toe clips - Front S ☐ M ☐ L ☐ XL ☐ Rear S ☐ M ☐ L ☐ XL ☐ + straps	£30	£30
Other pedals Front Please specify: _____	£ _____	£ _____
Other pedals Rear Please specify: _____	£ _____	£ _____

Carriers	
Blackburn MTN black ☐ or silver ☐	£25
Blackburn EX1+ black ☐ or silver ☐	£30
Thorn steel lo loader, black	£70
Thorn steel expedition rear carrier, black	£70

Dynamo Options	Adventure	Discovery
Busch & Muller 6 generator, B&M Lumotec + halogen headlamp with standlight inc upgrade bulb, Thorn stainless steel dynamo bracket, Thorn anodized alloy lamp mounting bracket ... As a "standby" lighting setup	£80	£80
Budget halogen dynamo set with upgrade bulb for front use only + Thorn stainless steel dynamo bracket. As a "standby" lighting setup.	£28	£28
Thorn stainless steel dynamo bracket, including screws	£3	£3

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Sub Total £

ACCESSORIES

Accessories	
Zefal HPX pump, best quality ever, easy to obtain high pressure (best to purchase this now to avoid size confusion at a later date)	£20
Composite MTN bottle cages, ultimate security and cleanliness £5.00 each ... Number required _____ **	£ _____
	£ _____
Thorn stainless steel dynamo bracket, including screws	£3
2 x Vista Lite Nebula (rear), 5 super bright LEDs (not British Standard) (fitted to Thorn rear carrier with a double LED bracket)	£25
Thorn stainless steel Cateye cordless sensor mounting bracket, including screws	£3
Spares kit - Includes - 2 x tubes, 1 x tandem gear inner, 1 x tandem stainless steel brake inner	£15
Others - Please specify: _____	£ _____
Others - Please specify: _____	£ _____
Others - Please specify: _____	£ _____

Please Note:- Occasionally some items become unavailable for long periods of time. We reserve the right to substitute items of similar (or greater) value where there will be no adverse difference in function. No surcharge will be made.
 **= A mixture of these cages is not only possible but actually recommended!

Total Cost £ _____